

REMARKS

According to a written opinion of International Searching Authority sent on January 11, 2005, the examiner is of an opinion that the inventions defined in claims 1 and 2 of the subject application lack novelty because there is no substantial distinction between these claimed inventions and the inventions disclosed in prior art documents 1 or 2 cited in the International Search Report, and do not involve inventive steps over prior art documents 3 and 4 cited in International Search Report, and the invention defined in claims 3 does not involve an inventive step over the prior art document 2 or the prior art documents 4 and 5 cited in the International Search Report.

In order to make clear the distinction between the inventions defined in claims of the subject application and the inventions disclosed in the above mentioned cited prior art documents 1 to 5, amendments have been made to the claims and to the specification. To be specific, Claim 1 has been amended to include limitations "variation reducing space connected to a gap formed between the two seal surfaces and having a volume that is able to inhibit occurrence of a blistering phenomenon in the main seal means."

Below, we argue that the invention defined in amended claim 1 has novelty and inventive step over the inventions disclosed in the prior art documents 1 to 5 cited in the International Search Report:

(1) Comparison between the invention defined in amended claim 1 of the subject application and the inventions disclosed in prior art documents 1 to 5 cited in the international search report.

The invention defined in amended claim 1 is such that a rubber main seal means and a resin sub-seal means are disposed between two seal surfaces such that the resin sub-seal means is located closer to a higher-pressure side region than the rubber main seal means in order to seal the gas, and a pressure variation reducing means is disposed gas elasticity as a semi-rigid body.

As should be understood from above, the cited prior art documents 1 to 5 disclose that annular grooves in which seal means, provided with concave grooves have spaces formed therein and the cited prior art documents 1, 3 and 4 disclose that a plurality of seal means are arranged in an axial direction; and the cited prior art document 5 discloses that

the opening direction of the concave groove of the seal means is changed. For this reason, it may be assumed that the "space" mentioned in the cited prior art document 1 corresponds to "variation reducing space" recited in amended claim 1, a combination of the rubber seal means and the resin seal means mentioned in the cited prior art documents 3 and 4 corresponds to a combination of a main seal means and a sub-seal means of the subject application. In addition, it may be assumed that the concave groove mentioned in the cited prior art documents 1 to 5 corresponds to the concave groove of the subject application.

(2) Distinction between the invention defined in amended claim 1 of the subject application and the inventions disclosed in the prior art documents 1 to 5 cited in the International Search Report:

The invention defined in amended claim 1 of the subject application has an objective to provide a seal structure capable of inhibiting leakage of a gas, the pressure of which varies greatly and becomes a high pressure. So, the invention defined in amended claim 1 is such that a main seal means and a sub-seal means are disposed between two seal surfaces and are arranged to be distant from each other in the axial direction, and a pressure variation reducing means is disposed between the main seal means and the sub-seal means to have a variation reducing space having a volume that is able to inhibit occurrence of a blistering phenomenon in the main seal means. Thereby, even when the high-pressure gas leaks from the resin sub-seal means toward the rubber main seal means, the gas pressure is reduced by the variation reducing space to inhibit occurrence of the blistering phenomenon in the rubber main seal means. Thus, stable seal ability is obtained.

In contrast, the cited prior art documents 1 to 5 disclose that the space is formed in the annular groove in which the seal means is provided. This space is formed to receive the fluidic pressure by the seal means. That is, this space is not a space capable of inhibiting occurrence of the blistering phenomenon in the rubber mean seal means, unlike the invention defined in amended claim 1 of the present invention.

Furthermore, the rubber seal means and the resin seal means are disposed to contact at a tapered surface, and are not intended to inhibit occurrence of the blistering phenomenon in the rubber seal means.

Therefore, unlike the invention defined in amended claim 1 of the subject application, the cited prior art documents 1 to 5 do not disclose or suggest a technical objective to inhibit the blistering phenomenon in the rubber main seal means if the gas pressure varies in a large variation range. In addition, unlike the invention defined in amended claim 1 of the subject application, the cited prior art documents 1 to 5 do not disclose or suggest that a variation reducing space having a volume that is able to inhibit occurrence of a blistering phenomenon in the main seal means is formed between the main seal means and the sub-seal means, which is formed to achieve the technical objective in the invention of amended claim 1. According to the cited prior art documents 1 to 5, if the high-pressure gas acts on the rubber seal member and its pressure varies in a large variation range, the blistering phenomenon occurs in the rubber seal member, which loses its seal ability. As a result, the seal structures disclosed in the prior art documents 1 to 5 are unable to inhibit the blistering phenomenon to maintain a stable seal ability, unlike the invention defined in amended claim 1.

As should be understood from above, the invention defined in amended claim 1 "a pressure variation reducing means that has a variation reducing space having a volume that is able to inhibit occurrence of a blistering phenomenon in the main seal means" is not obvious to those skilled in the art from the cited prior art documents 1 to 5, and therefore, the invention defined in amended claim 1 is believed to have novelty and inventive step.

Claims 2 and 3 recite limitations of the inventions defined in amended claim 1 and, also, are believed to have novelty and inventive step.

(3) It is submitted that the rejections stated by the International Examiner has been obviated.

Application No. (Not Yet Assigned)
Amendment dated April 13, 2006
First Preliminary Amendment

Docket No.: 19036/41822

Applicant believes no fee is due with this response. However, if a fee is due, please charge our Deposit Account No. 13-2855, under Order No. 19036/41822 from which the undersigned is authorized to draw.

Dated: April 13, 2006

Respectfully submitted,

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